PB85-213692

Superfund Record of Decision (EPA Region 2) Hudson River PCBs (Polychlorinated Biphenyls) Site, New York, September 1984

(U.S.) Environmental Protection Agency
Washington, DC

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Superfund Record of Decision:

Hudson River PCBs Site, NY

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16. ABSTRACT

During a 30-year period ending in 1977, the Hudson River was contaminated with polychlorinated biphenyls (PCBs) from two capacitor manufacturing plants owned by the General Electric Company. Field surveys have shown that PCB contamination is found in 40 submerged sediment hot spots, 5 exposed shoreline remnant deposits, dredge spoils on the banks of the upper Hudson River and in estuary sediments.

The remedial alternative selected for this site consists of in-place containment of remnant shoreline deposits. This temporary solution includes: covering affected areas with an 18-inch thick layer of subsoil followed by a 6-inch layer of topsoil, grading and seeding the cover to minimize erosion and, if necessary, bank stabilization to prevent scouring. An alternative to address submerged PCB hot spots was not selected at this time because of the lack of existing data to establish that existing technology would be effective and reliable. The State will conduct a dredging demonstration program using funds from Section 116 of the Clean Water Act. If adequate, the information from this demonstration project will be used to develop a remedial action which will address both river sediments and the exposed remnant deposits.

Key Words: Dredging, No Action Alternative, PCBs, Containment, Direct Contact, Temporary Remedial Measure, Volatilization, Environmental Impacts

DIS

17. KEY WORDS AND DOCUMENT ANALYSIS

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RECORD OF DECISION
Remedial Alternative Selection

Site: Hudson River PCBs Site; Glen Falls, New York

Documents Reviewed:

I am basing my decision primarily on the following documents describing the analysis of cost-effectiveness of remedial alternatives for the Hudson River PCBs Site:

- Feasibility Study - Hudson River PCBs Site, New York, NUS Corporation, April 1984.
- Staff Summaries and Recommendations.
- Responsiveness Summary dated September 1984.

Description of Selected Options:

- In-place containment of the remnant deposits by application of a soil covering followed by vegetation. In addition, banks currently unreinforced will be stablized and fences will be erected where appropriate to prevent public access.
- Evaluation of downstream domestic water quality at Waterford, New York and assessment of various treatment upgrading options if appropriate.

Declarations:

Consistent with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), and the National Contingency Plan (40 CFR Part 300), I have determined in-place containment of the PCB contaminated remnant deposits is a cost-effective method to effectively mitigate the most significant threats to health and the environment posed by the remnant deposits. The State of New York has been consulted and agrees with the approved remedy.

I have determined that a technologically feasible, cost-effective remedial response to PCB contamination in the riverbed that would be reliable and would effectively mitigate and minimize damage to public health, welfare and the environment is not presently available.

I have determined that the action taken is appropriate when balanced against the availability of Trust Fund monies for use at other sites. I have also determined that the off-site action of monitoring the downstream water quality at Waterford and assessing the adequacy of its water treatment facility is consistent with the goals and objectives of CERCLA to protect public health, welfare and the environment.

9/25/84
Date

Lee M. Thomas, Assistant Administrator
Office of Solid Waste and Emergency Response

Summary of Remedial Alternative Selection
Hudson River PCBs Site
New York

Site Location and Description: (see Figures 1 through 3)

The Hudson River originates in the Adirondack Mountains in Essex County, New York, and empties into the Atlantic Ocean at the Battery in New York City. The river's 17 major tributaries drain 13,365 square miles of land located in eastern New York State and in parts of Vermont, Massachusetts, and Connecticut. The lower river, from its mouth in the upper New York Harbor to its confluence with the Mohawk River near Albany, is a tidal estuary subject to periodic fluctuations in water level. This 150-mile reach is maintained and regulated as a Federal waterway by the U.S. Army Corps of Engineers to provide waterborne access to the Port of Albany and the New York State Barge Canal. The river above Albany is a high gradient, fresh water stream confined by 15 dams. The 30-mile reach between Albany and Fort Edward is officially under the jurisdiction of the New York State Department of Transportation (DOT).

Site History:

Over a 30-year period ending in 1977, two General Electric (G.E.) capacitor manufacturing plants near Fort Edward and Hudson Falls, New York discharged polychlorinated biphenyls (PCBs) to the Hudson River. Much of the PCBs in the discharges was trapped in sediments behind a 100-year-old dam at Fort Edward. After the removal of the dam in 1973, large spring floods scoured an estimated 1.5 million cubic yards of material from the former dam pool. Subsequent studies have revealed that the discharges, in combination with the removal of the Fort Edward Dam, have ultimately resulted in the dispersal of approximately one million pounds of PCB throughout the entire Hudson River system south of Fort Edward. Today, much of this PCB has either been dredged or washed out to sea so that only 498,000 to 656,000 pounds remain in the river. G.E. is also reported to have placed an additional 528,000 to 745,000 pounds of PCB in upland dumps. These PCBs are not directly related to the Hudson River problem (see Tables 1 and 2). The estimates above represent ranges extracted from various studies.

Action brought against G.E. by the New York State Department of Environmental Conservation (NYSDEC) in 1975 resulted in a $7,000,000 program for the investigation of PCBs and the development of methods to reduce or remove the threat of PCB contamination. Subsequent sediment surveys revealed that the most extensive contamination was confined to 40 submerged PCB hot spots

located in the river between Fort Edward and Albany, and to five exposed remnant deposits located in the former dam pool. PCBs were also found to exist in dredge spoils on the banks of the Upper Hudson River and in sediments of the estuary. Other monitoring data showed that minor quantities of PCBs were being released from river-bottom sediments to the water column and to the air and land adjacent to the river. The detection of PCB contamination in Hudson River fish resulted in a State-mandated ban on all fishing in the Upper Hudson River between Albany and Fort Edward, and in restrictions on commercial and recreational fishing in the Lower Hudson. In addition, it was feared that the continued presence of PCBs might disrupt dredging activities needed to maintain the barge canal and Federal waterways and might curtail the development of the river for hydroelectricity. For these reasons, NYSDEC proposed a partial cleanup of the river by dredging selected PCB hot spots (areas of relatively high PCB contamination, generally between 50 and 500 ppm) and containing the contaminated material in a secure upland containment facility.

Current Status:

In September 1980, Congress passed an amendment to the Clean Water Act (CWA) under Title 1, Section 116(a) and (b), entitled, "The Hudson River PCB Reclamation Demonstration Project." Under this legislation, construction grant funds up to $20,000,000 could be authorized by the EPA Administrator if he determined that funds were not first available under Section 116 or 311 of the CWA or from the then-proposed CERCLA. Congress authorized EPA to make grants to the NYSDEC in order to carry out the intent of the Act. The funding authorization was due to expire on September 30, 1983, but has since been extended (See Attachment 1).

The Hudson River Sloop Clearwater and other environmental groups and New York State brought suit to compel EPA to award the balance of $20 million under Section 116 of the Clean Water Act for the Hudson River Reclamation Demonstration Project. The parties agreed to a court order extending the September 30, 1983, expiration date of Section 116 funding. In March, 1984, EPA released funds provided under an earlier grant for the hot spots verification. On May 10, 1984, EPA entered into a settlement agreement with the plaintiffs. Under the terms of the agreement, EPA will make a grant to New York of approximately $18 million for dredging and disposal of PCBs if the State obtains an acceptable disposal site with all necessary State and federal permits within three years. The lawsuits were dismissed.

As a result of federal involvement and in accordance with the National Environmental Policy Act (NEPA) and requirements in Section 116, EPA Region II, on May 8, 1981, issued a Draft Environmental Impact Statement (EIS) on the Hudson River PCB problem. This was followed by a Supplemental Draft EIS on August 18, 1981. After review of the Final EIS (issued October 8, 1982),

the NEPA process was concluded on December 30, 1982, with a Record of Decision in which the EPA Administrator determined that funds for addressing this problem were available under CERCLA and that the problem rated sufficiently high to be considered for inclusion on the National Priorities List (NPL).

A Remedial Action Master Plan (RAMP) was initiated in May 1983 to evaluate all available information and assess feasible remedial options consistent with the National Contingency Plan. Before the RAMP was completed, the Hudson River PCBs Site was placed on the EPA's proposed NPL and, as a result, became eligible for CERCLA funding. The RAMP was subsequently changed to a feasibility study since the elements necessary in such a study were already incorporated within the RAMP document.

A draft Feasibility Study report was completed in September 1983 and became available to the public for a thirty (30) day review period starting October 7, 1983. Due to requests received at the public meeting held in Albany, New York on November 3, 1983, the comment period was extended to November 30.

The majority of the information used in this study was generated as a result of a 1977 sampling effort conducted by the NYSDEC. This sampling program established the hot spot locations. A limited amount of sampling was performed at selected hot spots in August 1983, by EPA. The 1983 data, when compared with the 1977 survey results, suggested that some hot spots may have shifted, while others stayed in place.

This summer NYSDEC staff have conducted an intensive sediment survey in the Thompson Island Pool. The purpose of the survey is to confirm the presence of PCB hot spots in the Upper Hudson River sediment and to identify their boundaries for dredging design purposes. In addition to the survey, the CWA Section 116 grant will fund the United States Geological Service's annual water monitoring, development of a DEC caged fish monitoring program, and DOH macroinvertibrate studies in the Upper Hudson River. Grant funds will also pay for a sediment erodibility study, a PCB transport study, and a PCB volatilization study.

Enforcement:

On May 5, 1983, EPA met with G.E. representatives to discuss the Agency's intentions of listing the Hudson RIver PCB Site on the NPL and to pursue negotiations with the company. The site was subsequently listed on the September 8, 1983 proposed NPL update.

On October 27, 1983, EPA issued a Notice Letter to G.E. as a responsible and liable party. This letter notified G.E. of EPA's intentions to conduct a predesign sampling program and implement the remedial alternatives unless the company agreed to do so itself.

G.E. responded to this letter by calling EPA's notice premature and unjustified. First, G.E. objected to the fact that EPA issued a notice letter for a site that is not on the NPL; and second, the company did not recognize a threat caused by the site to human health or the environment.

EPA has responded to G.E.'s letter by stating that remedial planning activities can be undertaken for a site on the proposed list. EPA may issue an order to the company for remedial design and cleanup. EPA also discovered that the Niagara Mohawk Power Corporation may also be a site owner and responsible party. A notice letter was issued on February 29, 1984, to Niagara Mohawk, and an order will be issued if it is determined that the company is a responsible party. Niagara Mohawk, which utilizes the Hudson River for hydroelectric power, received a permit to remove the dam located in Fort Edwards, which eventually resulted in the formation of the hot spots downstream.

Alternative Evaluation:

The major objective of the feasibility study was to evaluate remedial alternatives using a cost-effective approach consistent with the goals and objectives of CERCLA. A cost-effective remedial alternative is defined in the National Contingency Plan (NCP) (40 CFR 300.68(j) as "the lowest cost alternative that is technologically feasible and reliable and which effectively mitigates and minimizes damage to and provides adequate protection of public health, welfare, or environment." The NCP outlines procedures and criteria to be used in selecting the most cost-effective alternative.

The first step is to evaluate public health and environmental effects and welfare concerns associated with the problem. Criteria to be considered are outlined in Section 300.68(e) of the NCP and include such factors as actual or potential direct contact with hazardous material, degree of contamination of drinking water, and extent of isolation and/or migration of the contaminant.

The next step is to develop a limited list of possible remedial actions which could be used. The no-remedial-action alternative must be included on the list. Included were alternatives previously examined in the EIS and additional actions such as treatment of public water supplies. A number of new PCB treatment and destruction technologies were also reviewed to ensure that all reasonable alternatives were considered.

The third step in the process is to provide an initial screening of remaining alternatives. The costs, possible adverse effects, relative effectiveness in minimizing threats, and reliability of the methods are reviewed. This analysis requires a more detailed estimation of costs and engineering implementation and a closer assessment of the ability of alternatives to minimize or mitigate threats. In this study, the detailed analysis was aided by a cost-effectiveness matrix which was developed by independent consultants under the direction of EPA.

Alternatives were broken down into two specific catagories for evaluation. These were:

- o River sediment alternatives
- o Remnant deposit alternatives

A list of potential feasible alternatives has been assembled in Table 3, and associated costs have been provided.

Based on the analysis described above, the various categories of alternatives were evaluated, and the following conclusions were reached:

River Sediments

As outlined in the previous section, an alternative evaluation was initiated to determine which technologies would provide adequate protection to public health and the environment from the major contaminant pathways. The primary pathways that threaten public health are the ingestion of contaminated fish and the contamination of municipal drinking water systems. The spread of contamination to both of these pathways has not been fully quantified, since the PCBs are concentrated in the River sediment and the mechanisms of transport from the sediment to the water column and/or fish are poorly understood. Although studies of the river system are continuing, sufficient data to support a no-action alternative as the permanent recommended alternative are not available at this time.

Therefore, Numerous alternatives were assembled which potentially addressed the river sediment problem. Included in this list were various new technology options for in-river detoxification such as degradation by ultraviolet light, ozonization, chemical treatment, bioharvesting and activated carbon adsorption. In addition, in-river containment methods were analyzed for both shallow deposit locations and areas of high deposition.

While new technologies were explored in detail within the study, the majority of these options, though appealing, were dropped from consideration due to limited testing or lack of availability. These new technologies may be proven in the near future under more controlled circumstances (i.e., the OMC site) or under other types of study efforts (i.e., the CWA Section 116 demonstration project). Upon the successful completion of these types of projects, the recommendations presented in this document may very well need to undergo reevaluation and possible revision.

An evaluation of the treatment technologies indicated that although all of the technologies proved to be useful--or potentially so--in removing PCBs from oils, not all of the treatment methods could be used in connection with PCB-contaminated sediments. Some of the treatment technologies were found to be applicable for sediment decontamination,

but only two processes, KOHPEG and NaPEG, were found to be potentially applicable as an in-situ solution. For the other treatments, the sediments must first be exposed (by dredging or by river level reduction) and treated after dewatering.

Unfortunately, even the KOHPEG and NaPEG processes are still in the early stages of development, with little information being available on their environmental effects and costs. For this reason, these alternatives were dropped from further consideration at this time. Such new technologies listed above may prove not only reliable but practical at some point in the future, and might be available to address PCB problems which may exist in the Hudson River at that time.

In-river containment was evaluated in relation to other options available. It was determined that the initial costs associated with containment were comparable to a dredging option, however, the maintenance costs would be perpetual and, therefore, restrictively high. Also, the capping of contaminated deposits in a river system offers numerous technical and maintenance problems.

In addition, it is likely that even if technical problems can be resolved, installation of an artificial cover could result in a short-term disturbance(by less-contaminated sediments) of the contaminated sediments and their existing natural cover. In turn, this may substantially increase the contamination in the water column for some time thereafter. Finally, although an artificial cover could in theory decrease the overall long-term release of PCBs into the Hudson River environment, the marginal increase in protection (as compared to the natural sediment cover which now exists) will be considerably outweighed by the very high cost of such an action. For these reasons, this alternative was removed from further consideration.

EPA also evaluated the option of bank to bank dredging of the entire river. This alternative would remove the bulk of the PCB's on the upper river and therefore would be most effective in reducing the long-term public health and environmental threats from PCB exposure (although significant amounts of PCB's would be released into the water column in the short term). However, bank to bank dredging could be environmentally devastating to the river ecosystem and cannot be considered to adequately protect the environment.

In addition, even if the negative impacts could be eliminated, disposal of this quantity of contaminated sediments would require an impractically large containment facility. Finally, the cost of the bank to bank dredging alternative, given the level of risk presented even if the Agency takes no action, would appear to be excessive given the need to respond to other sites which may present threats to public health, welfare, and the environment.

EPA also evaluated two additional options which involved dredging a number of "hot spots" in the upper river basin. The full scale hot spot alternative would involve the dredging of 40 hot spots, and the more limited option would address 20 hot spots. These programs would remove an estimated 28-46% of the PCBs in upper river sediments, and an estimated 18-29% of the PCBs in the entire river. PCBs are ubiquitous in low concentrations throughout the river system, and the hot spot program would not address these low concentration areas. Furthermore, it is not clear that elimination of 28-46% of the PCBs in the river system would result in an equivalent decrease in the total amount of PCBs released from river sediments into the water column. It is possible that the rates of release in the environment are related to the exposed contaminated surface area of the river bed, and the hot spots constitute only about 8% of the affected area in the upper Hudson River Basin.

Modeling indicates that removal of the hot spots would have some positive effect on the river environment. One model produced an estimate that for the 40 hot spot dredging alternative it would take approximatly 46 years for PCBs in the Upper Hudson River to be fully depleted. Under the no action option for the river sediments, this model indicates that the PCBs in the upper river would be fully depleted in approximately 64 years (these time periods should only be considered indicative of the relative benefits of the no-action and hot spot options, since there are considerable uncertainties in the models). Furthermore, the times given refer to total depletion of PCBs, and it is likely that some level short of total depletion can be considered to provide adequate protection of public health and the environment. For example, although individual fish still may be highly contaminated with PCBs, the average level of contamination has declined below the FDA limit, and this decrease is expected to continue.

The above figures on the amount of PCBs which would be removed by hot spot dredging assume that a very high percentage of the PCBs in the hot spot areas would be controlled. However, the technology and methodology of this type of dredging in a dynamic, riverine environment is unproven and uncertain. Dredging activities by their nature tend to result in some degree of disturbance of the highly contaminated sediments, and thus result in some short-term problems, in the form of elevated PCB concentrations in the water and air, as well as increased fish contamination. Because the technology for reducing the disturbance of the sediment or controlling the spreading of the suspended materials is unproven in this type of a situation, it is difficult to estimate reliably the amount of the contamination which will be recovered or, on the other hand, the level of short-term damage which may result from releasing the PCB materials into the water column. Therefore, it is difficult to conclude at this time that the technology can be considered feasible or reliable.

The estimated cost of the limited and full-scale hot spot dredging alternatives is $34,000,000 and $55,000,000 respectively, assuming that a secure containment area could be constructed in the vicinity of the dredging site. However, the likelihood of such a site being available in the near future is highly questionable. Disposal of the wastes at the closest currently available site would increase the cost by as much as $200 million. (See PCB Disposal Alternatives discussion, below).

Finally, EPA evaluated the no-action alternative. This alternative could result in leaving 500 thousand pounds of PCBs in the river system . Natural on-going sediment transport mechanisms within the river have covered many of the PCB contaminated areas (hot and cold spots) with a less contaminated sediment layer, which significantly reduces the migration of PCBs in the water column and exposure to aquatic life.

Based on reviews of current data, the average level of contamination of Hudson River fish has declined below the FDA limit of 5 ppm although highly contaminated individual fish are still found in both the Upper and Lower Hudson. Consumers of fish are warned of exposure by NYSDEC restrictions that have been in effect since 1976. While the fish consumption limitation suggested by the ban certainly is not a solution to the problem, it does offer some level of protection. It is important to note that detectable levels of dioxin, dibenzofurans, mercury and chlordane (from known and unknown sources) have also been identified in Hudson River fish, and that even if PCBs decrease to an acceptable level, the fishing bans would continue on the basis of these other types of contamination. The enforcement of the fishing bans and the continued monitoring of the contamination should reduce the threat to consumers while the fish population continues its natural recovery during the interim evaluation period. It is projected that the natural assimilative capacity of the river will continue the downward trend in the levels of PCBs found in the river.

Concerns have also been raised regarding the effect of the no-action alternative on future ocean disposal of the dredged sediments generated during periodic river maintenance operation. Past conclusions about the problems with ocean disposal of dredged sediments may be misleading. The Draft Environmental Impact Statement indicated that, if certain unusual conditions were to occur, the PCB concentration of harbor sediments would continue to increase to a level above disposal limits and thereby restrict ocean disposal. This projection assumed that all of the PCBs in the Upper Hudson would reach the harbor in 64 years and that the dredging rate would remove at least a constant 4000 pounds of PCB per year (assuming sediment concentrations would either remain the same or increase).

It is now recognized that recently deposited harbor sediments are lower in PCB content than older sediments. Since dredging generally removes only the most recently deposited material, ocean disposal of dredged material should not be adversely impacted. If present conditions continue, the amount of PCB passing into the estuary will continue to decrease with time. Also, it is expected that, at the worst, the PCB concentration of previously deposited sediments will remain at current levels (about 3 ppm) and the level of PCBs in fresh dredge spoils will decrease. Furthermore, it has been shown by the "Final Environmental Impact Statement on Federal Channel Maintenance Dredging" that dredging plans for the next 10 years will not likely involve sediments of greater than 1 ppm PCB concentration, and that maintenance dredging is not expected to create significant environmental impacts.

In conclusion, while the no-action alternative cannot be considered to provide fully adequate protection to human health and the environment (due to the fact that several hundred thousand pounds of PCBs would remain in the river subject to only partial natural containment), both the modeling and sampling data collected to date indicate a decreasing threat to public health and the environment. The lack of sufficient data to establish the fate and transport of PCBs in the Hudson River prevents the Agency from making a final determination of no-action. Additional environmental data collection will continue during the interim evaluation period on feasible and reliable alternatives. The most feasible and reliable alternatives assessed by EPA (limited and full scale hot spot dredging) would be likely to decrease the level of risk somewhat. However, as is mentioned above, the actual reliability and effectiveness of current dredging technologies in this particular situation is subject to considerable uncertainty. For this reason the no-action alternative is recommended at this time. This decision may be reassessed in the future if, during the interim evaluation period, the reliability and applicability of in-situ or other treatment methods is demonstrated, or if techniques for dredging of contaminated sediment from an environment such as this one are further developed.

For example, dredging on a more limited scale may be conducted in the Hudson under the authority of §116 of the Clean Water Act; techniques developed for dredging operations under more favorable conditions at other Superfund sites may be applicable to dredging in this situation. However, even if hot-spot dredging technologies were more reliable, the estimated high cost of dredging and disposal might rule these out based on Fund-balancing considerations, especially given the moderate degree of risk reduction which may be achievable.

To protect area residents, the proposed action also includes a detailed evaluation of the Town of Waterford's water treatment facilities. This would include a sampling program and a subsequent analysis of the treatment operation. The decision for providing upgraded or alternative facilities could then be made.

Even though existing data show little problem at Waterford. there is a possibility that a threat could arise. The cost of this evaluation is low ($120,000), and is justified to ensure protection of the public.

Treated drinking water from the Waterford supply system rarely exceeds 0.1 ppb of PCBs according to United States Geological Survey (USGS) studies. Based on results of 35 samples (collected by N.Y. State), the PCB concentration of Waterford drinking water averages 0.06 ppb. No study of Waterford drinking water has ever found PCB concentrations in excess of 1 ppb, which is the maximum allowable exposure promulgated by the New York State Department of Health (NYSDOH). However, analysis of river water quality at Waterford indicates incidents where PCB concentrations have exceeded 1 ppb, therefore, generating some concern and thus a more thorough evaluation is needed. The USGS has taken samples of the water before and after treatment in the mid-1970's. Analysis of these historical data show that concentrations of PCBs in the river water are greatest during high flows and during low flows. Consistent with this, water supplies at Waterford should be sampled during the spring, when flows are highest and during August or September when flows are at a low. The water should be sampled before and after treatment. The sampling results will allow evaluation of the effectiveness of the treatment facilities and show whether upgrading is required.

Remnant Sites

An alternative evaluation was performed consistent with the procedures outlined previously. Included in the list of alternatives was an array of options that were initially reviewed in the EIS. Of primary concern was the potential for direct contact by the public with the PCB contained within the remnant sites. This was found to occur via two pathways, one being direct physical contact by being on the site and the other through an air vector whereby PCBs migrating either through adherence to dust particles or volatilization would reach bordering communities. A secondary concern was the continuous discharge of PCBs from the remnant sites into the river.

Based on the alternative assessment, three options were determined to mitigate adequately the pathways for human exposure through direct contact and volatilization, although the degree of effectiveness differed among them. These three options also either eliminated or limited the migration of PCB contamination into the river.

The three alternatives selected for further analysis included:

- Complete removal of the remnant sites,
- Partial removal of the remnant sites, and
- In-place containment

It was found that complete removal of the remnant sites would provide the most effective option for addressing PCBs and the associated pathways of exposure. This option would provide for the elimination of the direct contact pathway which is the major health concern, and would eliminate leaching of PCBs into the river from these sites.

In addition, this action would be consistent with current TSCA requirements to provide secure facilities for PCB waste. While TSCA PCB regulations would not require that this contamination be removed, since the creation of the remnant sites preceded the enactment of TSCA, the TSCA technical standards of the regulation would generally call for PCBs to be disposed of in approved landfills and not located in floodplain areas.

While this option would eliminate the long-term impact associated with the PCBs, there may be some adverse short-term impacts on public health. Any large-scale excavation action will result in an increase in a PCB release to the air (This is documented by past dredging operations where air concentrations of PCBs rose from less than 1 ug/m^3 to 9 ug/m^3 during the removal of remnant site 3A). In addition, a large number of truck trips (40,000) would traverse residential areas, creating a potential health hazard and disrupting normal activity. Erosion and resuspension of PCBs into the river would also increase during the removal operations.

A removal alternative would be most effective in eliminating any possibility of future PCB exposure from the remnant sites. An evaluation of the cost associated with such an action indicates that initial capital cost would be in excess of $12,000,000, based upon the availability of a secure landfill within the study area. As mentioned previously, the possibility of a local site being available is remote. A rough estimate of the additional expense that would be required to transport and dispose this material at a secure site (the closest being Niagara Falls) indicates that $50,000,000 would be needed.

The second option is the excavation and off-site disposal of the portions of the remnant sites contaminated with greater than 50 ppm PCBs, and the in-place containment of the remaining PCB-contaminated portions of the site. This option, like the other two options, would eliminate the risk of direct contact with PCB contamination in the remnant deposits (assuming the cap is properly maintained) and by decreasing the amount and concentrations of PCBs contained would substantially reduce the amount of PCBs migrating into the Hudson River via ground water (as compared to alternative 3, described below), although unlike alternative 1 it would not completely eliminate such discharges. However, the second option poses the same problems as the total removal option, in that it would require large scale excavation which has the potential of releasing increased amounts of PCBs into the air over a short period of time. Limited removal would be less expensive (approximately $9,000,000) than alternative 1,

but it would still be substantially more expensive than alternative 3, especially in the absence of a secure disposal area near the sites.

The third option assessed was in-place containment of the PCB-contaminated remnants. This option was recommended over excavation and off-site disposal in the EIS prepared for these sites. The originally proposed alternative envisioned the complete isolation of the remnant deposits by construction of impermeable walls or barriers and installation of clay caps.

As explained below, further analysis indicates that complete isolation is neither feasible nor practical at these sites; however, the amount of PCBs which may be discharged to the river is relatively low, especially in the context of existing levels of contamination in the river.

The remnant sites are located on the floodplain of the river. Some of the contaminated sediments were found to be up to 15 feet deep. Thus, it would be impossible to prevent the ground water, which at this point is directly related to the river level, from entering the contaminated sediments from the bottom (through the soil). Isolation of the remnant sites hydrogeologically would be very difficult without some form of bottom sealing using impermeable materials. Bottom sealing has only been looked at on a lab scale, and has not been demonstrated to be technologically achievable at this time.

Since the remnant sites could not be totally isolated from ground water, there is no point in constructing impermeable barriers around them, nor is there any point in installing a clay cap. A soil cover using 18" of subsoil placed in 6" lifts and a final 6" layer of topsoil would adequately achieve the primary objective of eliminating direct public contact with the contaminated materials while also substantially reducing infiltration (80 percent compared to 90 percent for a clay cap).

In addition, a rip/rap stabilization system upgraded above the 100 year flood level will assure the integrity of the sites. (See Addendum 1). Finally, the sites will be fenced and posted to prevent public access. There is, however, the potential that without proper maintenance and monitoring of these sites, PCBs may become exposed and present a health risk.

Under the third option, the remnant deposits would continue to provide a source of PCB migration, through ground water, into the river system. However, while levels of PCBs migrating from the site have never been measured, it is believed that the bulk of the PCBs are locked up in the remnant materials, and that the discharges into the river are at relatively low levels. In light of existing levels of PCB contamination in the river system, it is believed that such discharges are not particularly significant.

Each of the options assessed would be effective in mitigating or eliminating the threats to human health from direct contact and volatilization. In-place containment would address this concern for a cost of $2.3 million, substantially less than the other two options. Options 1 and 2 would also eliminate or reduce the migration of PCBs into the river system through ground water. However, both excavation options pose a similar risk of a short-term increase in the release of PCBs, and both are substantially more expensive than option 3. Given this substantial additional expense, it is important to assess the utility of eliminating this small source of PCB release. But this is difficult to determine, pending an ultimate decision on whether and how the contaminated sediments will be addressed. Therefore, because in-place containment is the least expensive option that effectively mitigates the direct contact threat and because the merits of excavation cannot be adequately assessed based on current information, in-place containment is the recommended remedial option for the remnant sites at this time. The appropriateness of further remedial action for these sites will be reexamined if EPA decides at a later date to take additional action with respect to sediments in the river.

PCB Disposal Alternatives:

In order to assess the costs of each of the dredging/remnant excavation projects discussed above, an evaluation was performed which reviewed available PCB disposal options. These included a range of options from placement in a secure landfill to detoxification/destruction techniques. While the new technological options were appealing, the limited historical data available were sufficient to conclude that these alternatives would be unreliable at this time, but quite promising in the future. An analysis of remaining alternatives was then undertaken with the following two assumptions:

- for all options, dredging of PCB hot spot sediments/remnant sites would be performed, and,
- a site would be provided by N.Y. State within the study area that would by acceptable as a secure landfill for the PCBs.

The most effective disposal option available was determined to be incineration since it would provide almost complete destruction of the PCBs. However, the capital costs associated with constructing a multi-incinerator system that would have the capacity to handle the massive amounts of PCB sediments would be quite large, approximately $250,000,000.

A wet air oxidation process which could be applied to the removed sediment was also found to be effective, but would require extensive land area during operation. The capital cost for this option would be higher than incineration.

While the two alternatives discussed above were found to be the most effective in containing and/or removing the harmful aspects of PCBs, their costs were a limiting factor.

EPA also evaluated the disposal of the PCB sediment in a secure landfill, which satisfied the PCB regulations under TSCA. This facility would be located within the study area and would be effective in providing an adequate level of protection for the public and the environment. The costs associated with such an option would be approximately $20,000,000 and therefore would represent the cost-effective alternative.

Note, these estimates assume that a containment site would be available within the study area. Based on recent events the likelihood of this occurring in the immediate future is remote. With this in mind, a rough assessment of disposal costs at a privately owned secure facility (the closest being CECOS in Niagara Falls, N.Y.) indicates that, for 40 hot spots or approximately 1,450,000 cu. yd. of material, costs in excess of $120,000,000 could be anticipated. Transportation costs are not included and would add an additional $90,000,000 to this figure.

Community Relations:

In October of 1982, EPA issued a Final Environmental Impact Statement (EIS) on the Hudson River Demonstration Project. In the December 1982 Record of Decision (ROD), EPA found that the project should be considered for funding under CERCLA (Superfund). See Attachment 2.

Under Superfund, the NUS Corporation was requested to prepare a Remedial Action Master Plan (RAMP). During the development of the RAMP, it was determined that the document contained all the elements to be considered a feasibility study and it was renamed such in order to accelerate the decision process on remediation at the site.

The draft feasibility study was the subject of a public meeting held in Albany in November 3, 1983 (Attachment 3). As a result of comments at the meeting, the public commment period (originally scheduled to run 30 days and end on November 7, 1983) was extended through November 30, 1983.

Numerous comments were received from a broad range of public and private concerns. Response to these commments is the subject of a responsiveness summary prepared by EPA and its consultant, NUS Corporation.

Consistency with Other Environmental Laws:

The recommended alternative for the remnant sites has been reviewed for consistency with regulations under TSCA governing the handling and disposal of PCBs. The TSCA regulations do not require that PCBs disposed (including PCB-contaminated soil) in a landfill before February, 1978, be removed. However, the rules provide that if PCB-contaminated soil is disposed, or if PCB contamination is removed for disposal after that date, it must be disposed of either by incineration or in a chemical waste landfill which complies with the TSCA PCB regulations. If these regulations were legally applicable to the remnant deposits, containment using the methods described above would not meet those standards. For example, the containment area is not located in low permeability soil and does not include a synthetic liner; is not sufficently above the ground water table, and is located in a floodplain area. Full consistency with these TSCA standards is not being achieved because in-place containment is intended as an interim remedy to address the direct contact and volatilization threat posed by the sites. The remedy is not intended to eliminate the low levels of release of PCBs into the Hudson River.

Cost:

The following figures represent an estimate of the costs associated with the proposed actions. It has been the decision of the NYSDEC to take the lead on this project. The site has been classified as a 90 percent federal and 10 percent State cost-sharing site for remedial implementation activities.

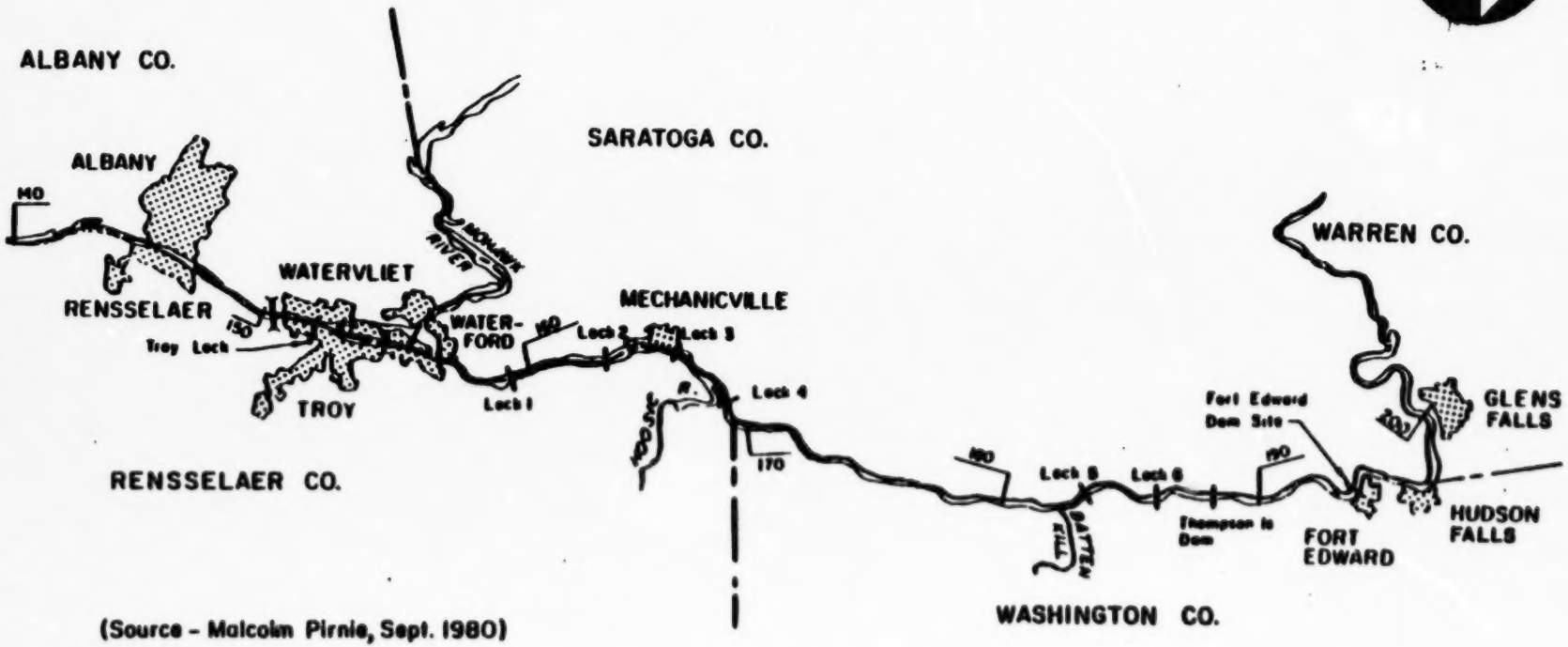
Activity	Capital Cost
Design of remnant sites containment (RD)	$200,000
Implementation of remnant containment (RA)	2,230,000
Waterford water supply evaluation	120,000
State administration/management (12%) ($278,000 for construction)	310,000
TOTAL	$2,950,000

	90% (RA)	100% (RD)	Total
Federal Share	$2,338,200	352,000	$2,690,200
State Share	$ 259,800	0	$259,800
			$2,950,000

The above figures for remnant containment are based upon covering all sites with surface dimensions estimated from existing data. Actual pre-design evaluation, however, may result in a containment area somewhat smaller due to site erosion or reevaluation of PCB levels.

Schedule:

Proposed schedules for the recommended activities have been prepared (Figures 4 and 5).

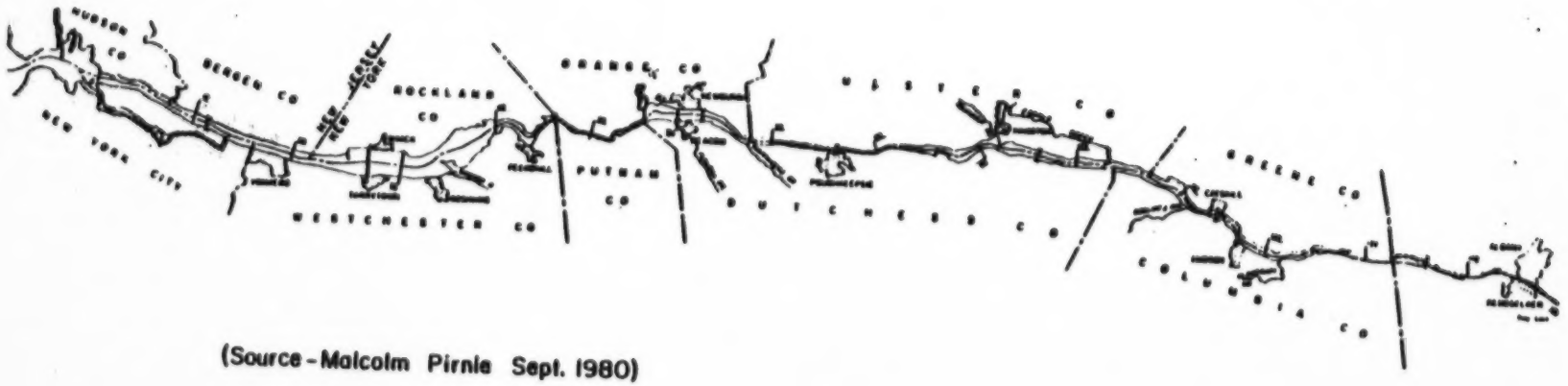


(Source - Malcolm Pirnie, Sept. 1980)

PROJECT AREA
UPPER HUDSON
HUDSON RIVER PCB SITE, HUDSON RIVER, NY
NOT TO SCALE

FIGURE 1

NUS CORPORATION
A Halliburton Company



(Source - Malcolm Pirnie Sept. 1980)

PROJECT AREA
LOWER HUDSON
HUDSON RIVER PCB SITE, HUDSON RIVER, NY
SCALE: 1" = 16 MILES

FIGURE 2-

NUS CORPORATION

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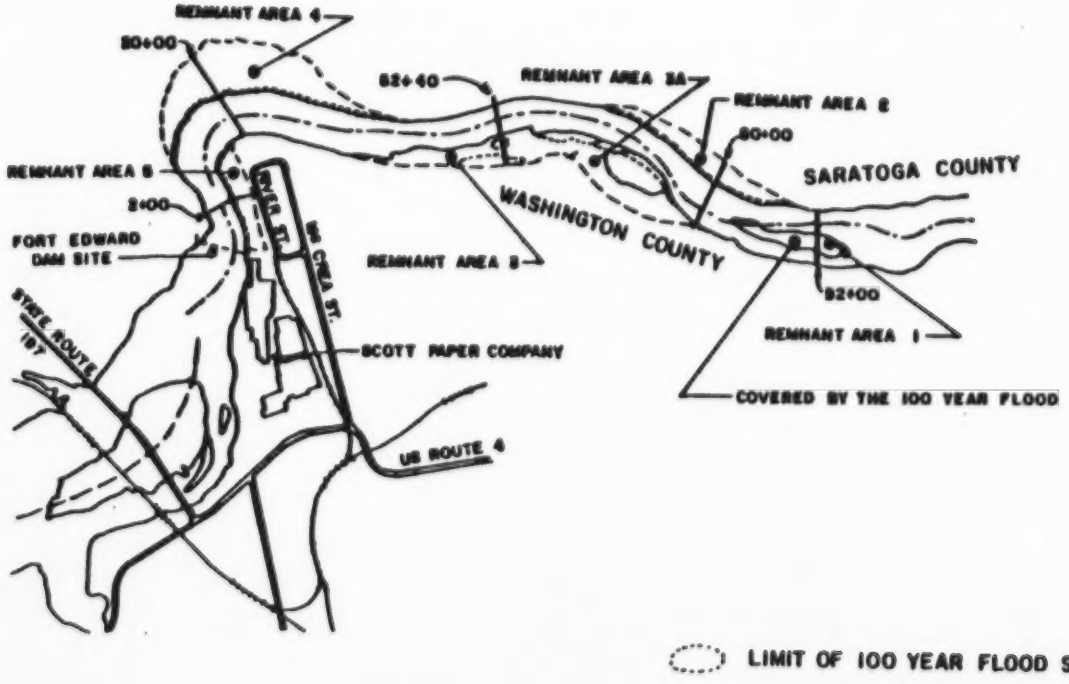

FIGURE 3

PLAN VIEW, REMNANT DEPOSITS
HUDSON RIVER PCB SITE, HUDSON RIVER, NY
SCALE: 1" = 2,000'

NUS CORPORATION
A Halliburton Company

TABLE 1

PCB CONTAMINATION IN REMNANT DEPOSITS

Remnant Area	Area (acres)	Avg. PCB Concentration (ppm)	Contaminated Depth (ft)	Contaminated Volume (yd^3)	PCB Mass (lb)
1	4.0	20	2	12,900	450
2	8.0	5	5	64,530	570
3	13.3	65	8	160,925	18,550
3a	6.0	1000	1	9,680	17,000
4	12.0	25	2	38,720	1700
4a	8.5	40	3	41,140	2900
5	4.0	250	8	31,630	22,650
Total	55.8			359,525	63,820
Less Area 3a					17,000
Remaining					46,820

Source: (Toffiemire, 1980).

TABLE 2

Estimated Mass of PCB in the Hudson River Basin Associated with General Electric Plants Near Fort Edward, New York

UPPER HUDSON RIVER BASIN

Remnant Deposits	46,820 - 108,600 pounds[1]
Thompson Island Pool Sediments[2]	
Hot Spots	97,700 - 105,800
Cold Areas	22,000 - 30,900
Remaining Upper Hudson Pools	
Hot Spots	60,600 - 64,100
Cold Areas	101,400 - 146,400
Subtotal, Upper Hudson River Sediments Only	
Hot Spots	158,300 - 169,900
Cold Areas	123,400 - 177,300
	281,700 - 347,200
Dredge Spoils	103,455 - 160,000
Dumps	528,000 - 745,000
Subtotal, Upper Hudson Basin Only	959,975 - 1,360,800

LOWER HUDSON RIVER BASIN

Sediments	169,000 - 200,000
Dredged	86,000
Washed out to sea	200,000
TOTAL PCB	1,414,975 - 1,846,800

1 Remnant deposit totals do not include estimates for area 3A.

2 Thompson Island Pool totals include estimates for sediments above Lock 7.

Sources: Bopp et al. 1978
Hetling et al. April 1978
Toffiemire and Quinn 1979
Malcolm Pirnie 1980

ATTACHMENT 1

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

SEP 29 1983

THE ADMINISTRATOR

Because of the continued interest in the PCB reclamation project in the Hudson River, I am writing to advise you of my present intentions concerning that project.

In our July 26, 1983 meeting and my subsequent letter to you, I indicated that EPA was conducting an evaluation of possible alternative remedial actions which could be undertaken to mitigate the PCB contamination problem in the Hudson River. The Agency has received the preliminary results of its feasibility study which incorporated the data developed in our October 1982 Environmental Impact Statement (EIS) and an additional analysis of cost-effective alternatives.

The draft feasibility study considered 36 alternative cleanup plans including a number of new PCB treatment and destruction technologies. All reasonable alternatives were considered. The recommendations in the draft study indicate that the only cost-effective actions that should be considered for funding under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) are (1) the containment of exposed deposits of polychlorinated biphenyls (PCBs) at five contamined areas along the shoreline of the Hudson River and (2) the evaluation of drinking water supplies at Waterford, New York to determine if PCB contamination poses any potential threat to the public. Preliminary estimates are that the shoreline project would cost approximately $1.8 million.

The study also concluded that the dredging of bottom sediments, whose PCB concentration is greater than 50 parts per million, is not cost-effective because: (1) the lack of a defined threat to public health; and (2) the difficulty in showing that significant environmental and public health benefits would result.

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The draft feasibility study will be available for a three week public comment period as soon as the finishing touches are placed on the document. We expect public release before October 7, 1983. After analysis of public comments, a final remedy under CERCLA will be selected for design and implementation.

Because it appears that CERCLA funds may not be available for the dredging project, I have decided to consider an application under section 116 for a PCB demonstration project. The State of New York should prepare an application sufficient to meet all of the statutory requirements set out in section 116. Two of the requirements which are of particular concern to me at this point are the availability of a secure landfill site, and better data defining the location of the significant bottom sediment areas. As you know the State of New York was recently directed to revoke the State permits for the secure landfill site previously selected. Further, recent EPA sampling of the PCB contaminated sediments in August 1983 indicates the location of the areas may have shifted since the last sampling was done in 1977. I am willing to consider a PCB dredging project for funding when these two matters are resolved.

The potential problem of the authority and funds available under section 116 expiring on September 30, 1983 was alleviated on September 23, 1983 when a consent order was issued in the lawsuits where the Agency's prior decisions to proceed under CERCLA on the PCB project are being challenged. In those suits, brought by several environmental groups, Congressman Richard Ottinger and the State of New York, I have agreed to a court order deferring the expiration date of the authority to expend funds under section 116(b). This order should give us the opportunity to insure that the intent of Congress is carried out.

The Agency shares your concern that this matter be acted on as soon as possible. We are ready to proceed promptly toward implementing the appropriate measure to solve problems caused by PCBs in the Hudson River.

Sincerely yours,

Bill

William D. Ruckelshaus

TABLE 3

REMEDIAL ALTERNATIVES AND COST COMPARISONS
HUDSON RIVER PCB SITE, NEW YORK

	Remedial Alternative	Capital Costs	O&M Costs	Total Costs
1.	Detox. of Sediments with KOHPEG	$289,877,000	$ 0	$289,877,000
2.	Wet air oxidation of sediments	$109,340,000	$ 0	$109,340,000
3.	Incineration of sediments	$249,787,000	$ 0	$249,787,000
4.	Secure landfill disposal of sediments	$ 15,203,000	$ 1,887,000	$ 17,090,000
5.	Dredging of 40 hot spots	$ 54,987,000	$ 5,321,000	$ 60,308,000
6.	Reduced scale dredging	$ 34,048,000	$ 5,321,000	$ 39,369,000
7.	No remedial action, water supply not treated	$ 120,000*	$ 3,434,000	$ 3,434,000
8.	No remedial action, water supply treated	$ 114,000	$ 3,617,000	$ 3,731,000
9.	Total removal of all remnant deposits	$ 12,894,000	$ 1,887,000	$ 14,781,000
10.	Partial removal of remnant deposits	$ 6,917,000	$ 3,011,000	$ 9,928,000
11.	Restricted access to remnant deposits	$ 372,000	$ 1,124,000	$ 1,496,000
12.	In-place containment of remnant deposits	$ 2,324,000	$ 1,124,000	$ 3,406,000
13.	In-situ detoxification of remnant deposits	$ 66,696,000	$ 0	$ 66,696,000
14.	No action on #1, 2, &4/restrict access to #3 & 5	$ 154,000	$ 1,124,000	$ 1,278,000
15.	Partial removal/contaminant of remnant deposits	$ 9,010,000	$ 3,011,000	$ 12,021,000
16.	Partial removal/restricted access of remnant deposits	$ 7,144,000	$ 3,011,000	$ 10,155,000
17.	Partial containment/restricted access to remnant deposits	$ 1,053,000	$ 1,124,000	$ 2,177,000
18.	Partial containment/in-situ detoxification of remnant deposits	$ 38,878,000	$ 1,124,000	$ 40,002,000
19.	Partial removal/in-situ detoxification of remnant deposits	$ 42,622,000	$ 1,887,000	$ 44,509,000
20.	Partial detoxification/restricted access of remnant deposits	$ 36,853,000	$ 1,124,000	$ 37,977,000

*Includes Proposed Treatability Study

ADDENDUM 1
Hudson River PCBs Site
New York

FLOOD PLAIN MANAGEMENT ASSESSMENT

I. Purpose

The purpose of this addendum is to:

1. Review Executive Order No. 11988, May 24, 1977, 42 F.R. 26951 entitled Floodplain Management;

2. Review applicable status referred to in the Executive Order as required;

3. Review the proposed remnant site contaminment option as it relates to the floodplain of the Hudson River;

4. Summarize the review and describe any technical requirements necessary to comply with (1) and (2) above.

II. Introduction

A feasibility study was prepared by NUS Corporation, EPA's consultant, which evaluated alternatives to remediate the PCB contamination at five (5) remnant sites located in the Upper Hudson River floodplain. These remnant sites were formed when the Fort Edward Dam was removed in 1973 leaving more than 1.5 million cubic yards of contaminated sediments in five discrete deposits exposed along the edges of the river in a 1.5 mile stretch upstream of Fort Edward. The locations of these remnant deposits are illustrated in Fiqure I. A large percentage of the PCBs have been scoured and transported downstream. In addition, some have been removed through prior dredging. Approximately 10 percent of the total PCBs remain.

The remnant deposits contain high amounts of sawdust, wood chips, and other debris remaining from a once thriving lumber industry.

The most highly contaminated sediments were generally found in the top few inches of sample cores; however, significant contamination extended up to 10 feet below the surface. PCB levels ranged from 5620 ppm at the surface of a core from site 3a to less than 3 ppm, which was commonly found a few inches deep in many samples. PCB concentrations tended to increase with distance from the edge of the present below bank. This trend is characteristic of the river below the remnant deposits and is related to velocity distributions and sediment characterisitics as will be discussed later.

The remanant deposits were subjected to a number of remedial activities between 1974 and 1978, the most significant of which was the excavation and containment of remnant area 3a. The unstable banks of areas 3 and 5 were graded and stabilized with stone riprap and these areas, along with area 2 were revegetated. An aerial inspection in 1983, however, revealed that the plantings had not taken well. Remnant deposit 1, which is an island, had not been subjected to any remedial action. The aerial inspection in 1983 showed it to be much smaller than before.

Ninety percent of the time, the river surface elevation is at or below the lower boundary of significant PCB contamination within the remnant deposits (Malcolm Pirnie, Inc., 1978). Thus, bank scour during periods of high flow is the principal mechanism responsible for the transfer of PCBs to the lower reaches.

Infiltrating rain water and runoff, as well as groundwater movement, carry some desorbed PCBs to the river; however, this contribution is insignificant compared to the PCB load passing Rogers Island. Remnant deposit saturation during floods would not contribute significant amounts of PCBs to the river since the hydraulic gradient would slope away from the river during these periods and desorbed PCBs would be carried inland where they would be attenuated by soil particles.

Malcolm Pirnie, Inc., (1978) estimated that approximately 8600 pounds of PCB per year were lost to the river from the remnant deposits before remedial activities were implemented. Tofflemire and Quinn (1979) suggested that after remediation, the unstable bank areas of remnant deposit 4 presented the greatest potential for future erosion losses. The most highly contaminated desposits, areas 3 and 5, are not likely to erode because they are adequately protected against flows substantially higher that the average annual flood.

Figures II through VI depict typical cross sections at the remnant deposits and relate contaminated materials and remedial construction features to river stages.

Inscribed on these figures are the values for the average annual and 100 year flood elevations. The following table illustrates the current situation. It is important to note that the figures are based on data accumulated in 1977 and since then erosion and runoff may have altered the dimensions of the remnant areas.

Elevation (feet above mean sea level)			
Remnant Site	1977 Site	Average Annual Flood	100 Year Flood
1	134	133	137
2	>137	133	138
3*	>132	130	134
4*	>132	133	133
5*	>130	127	130

*Site partially riprapped

These sites are basically in pool type areas of the Hudson River where flow vectors would be less than in the main channel of the river.

III. Proposed Site Remedial Action

The selected remedial action for the remnant deposits is in-place containment. These areas will be covered with an 18 inch thick layer of subsoil followed by a 6 inch layer of topsoil. The cover will then be graded and seeded to minimize erosion and, in appropriate areas, raised to ensure the integrity of the site. Where necessry, bank stabilization will be performed along the riverbank in the form of riprap. Fencing and posting will be placed, where necessary, to restrict public access.

IV. Flood Plain Regulatory Requirements

In accordance with Executive Order 11988, Floodplain Management, an applicable executive agency shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains. In addition, it is necessary to evaluate the potential effects of any action that may be taken in a floodplain and that potential harm is minimized.

The following agencies would be involved in any floodplain management efforts:

- o United States Environmental Protection Agency
- o U.S. Army Corps of Engineers
- o Federal Emergency Management Agency
- o New York State
  - Department of Environmental Conservation
  - Department of Transportation
- o Town and Villages bordering on the Hudson River.

As a responsibility under the cooperative agreement between the USEPA and the NYSDEC the appropriate agencies and concerned groups will be kept abreast of proposed design design and construction activities.

The EPA in conjunction with the NYSDEC has determined that the proposed activities for the remnant sites are the most practical option available in light of current funding limitations and technical constraints. An option that was evaluated as being the most-effective in removing the PCB vectors would require complete removal of the remnant sites. If this option were implemented, the floodplain upstream would result in a larger cross-section. It must be pointed out that major charges in the floodplain were incurred as a result of the removal of the Fort Dam in 1973, since the levels of river water decreased upstream.

V. Flood Hazard Assessment

The flood hazard associated with this project would be in the upstream effects of introducing fill material onto the remnant sites. The proposed action would provide a soil cap on the remnant sites as well as securing the banks to contain PCBs at the sites and deter erosion into the river, as well as, eliminating the direct human contact vector.

Based upon the data available, which are depicted in the attached figures, the amount of fill necessary to raise the sites above the 100 year flood level is insignificant since the majority of the remnant sites are currently above the flood elevation. There should therefore be insignificant adverse impacts on the surrounding environment during flooding.

The design of the proposed action will incorporate erosion control in the form of

- o Riprap shoring of banks
- o Vegetative protection
- o Future maintenance

The beneficial effects on the human environment and the river ecosystems by containing/controlling this PCB source greatly outweigh the minimal if any impacts on the 100 year floodplain by the proposed action.

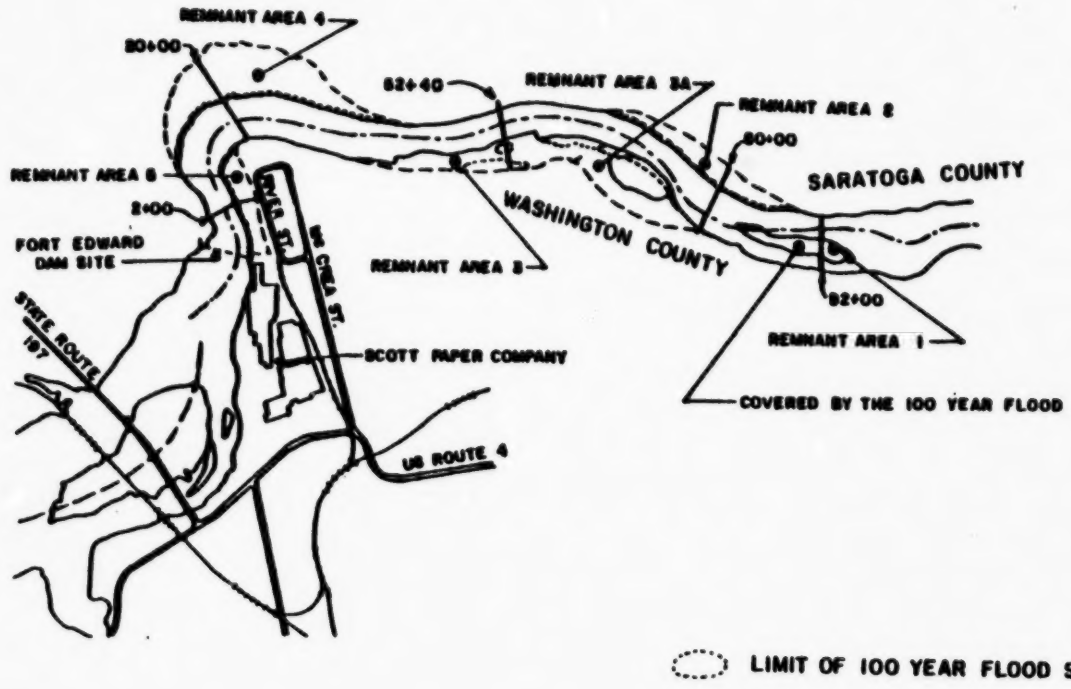

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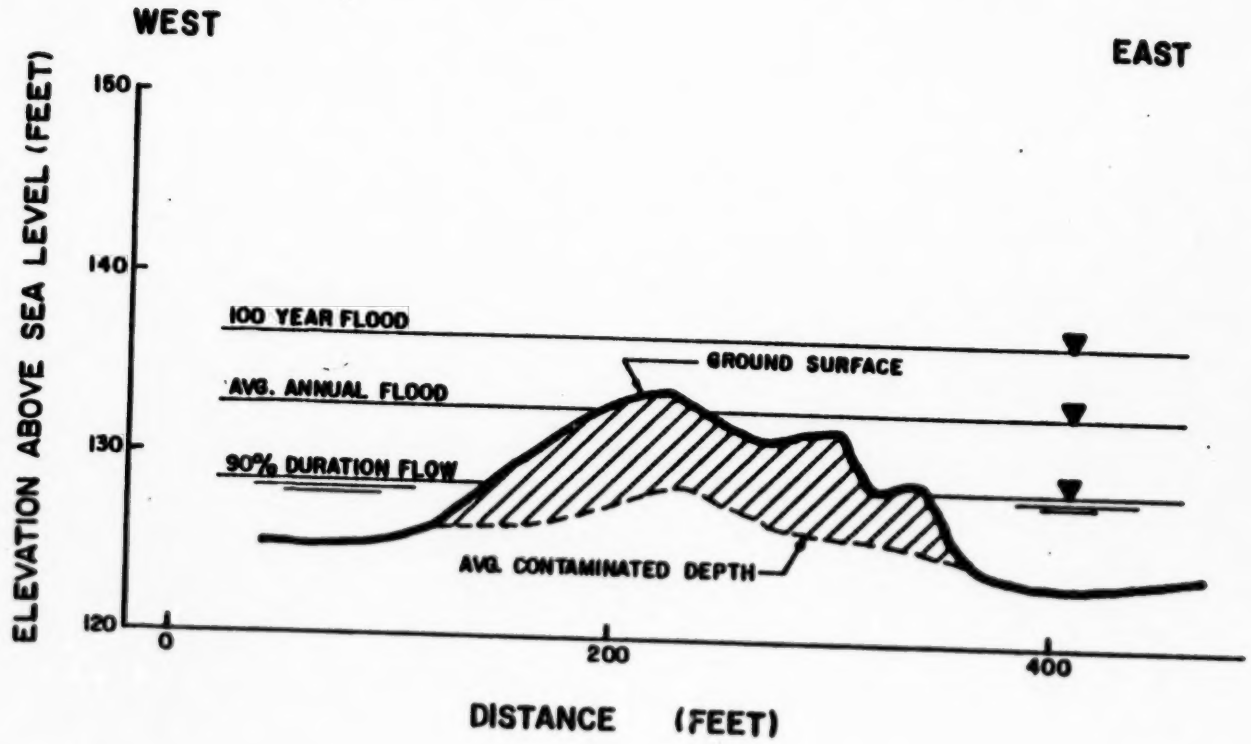
FIGURE I

PLAN VIEW, REMNANT DEPOSITS
HUDSON RIVER PCB SITE, HUDSON RIVER, NY
SCALE: 1" = 2,000'

NUS CORPORATION
A Halliburton Company

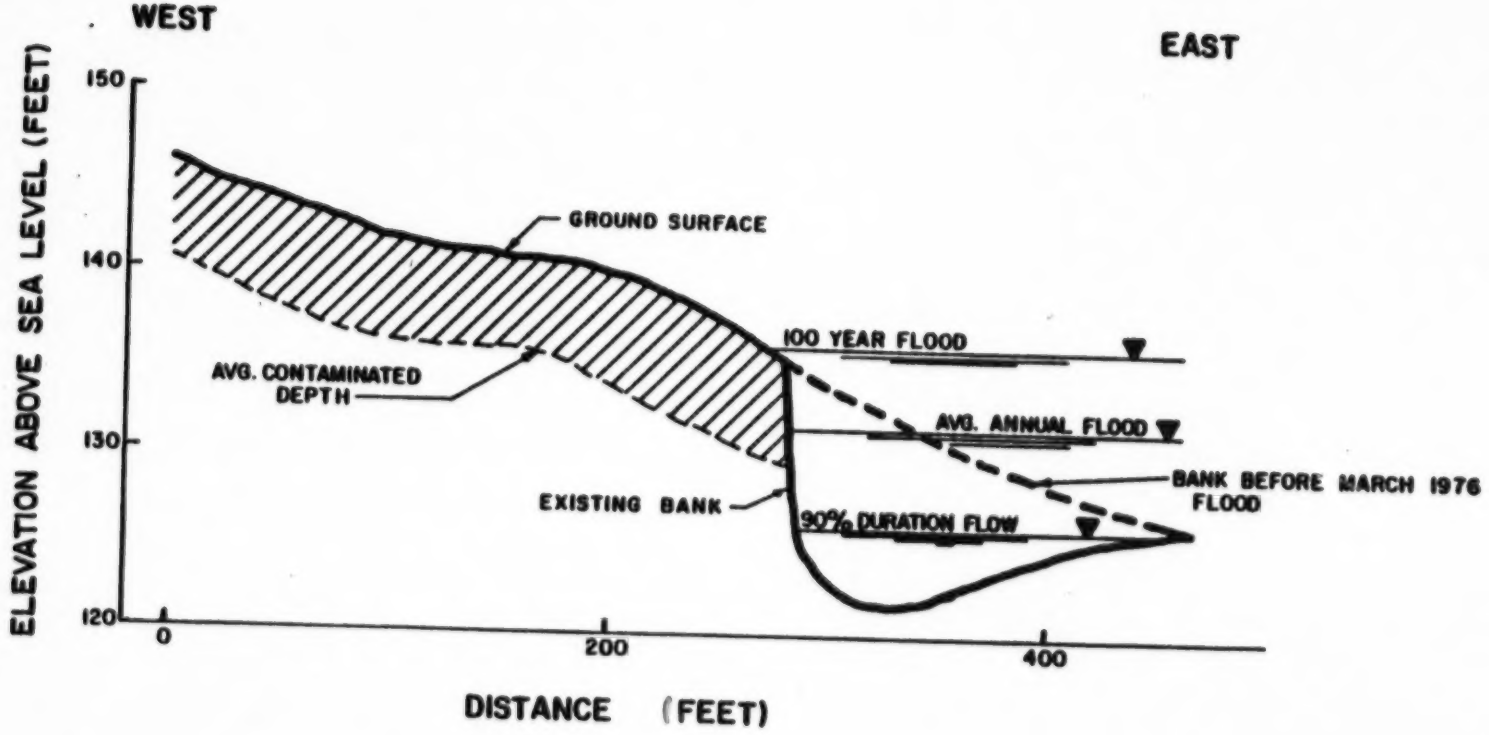


SOURCE: TRANSECT 92+00, MALCOLM PIRNIE (1977)

FIGURE II

TYPICAL CROSS SECTION AT REMNANT DEPOSIT 1
HUDSON RIVER PCB SITE, HUDSON RIVER, NY

NUS CORPORATION
A Halliburton Company

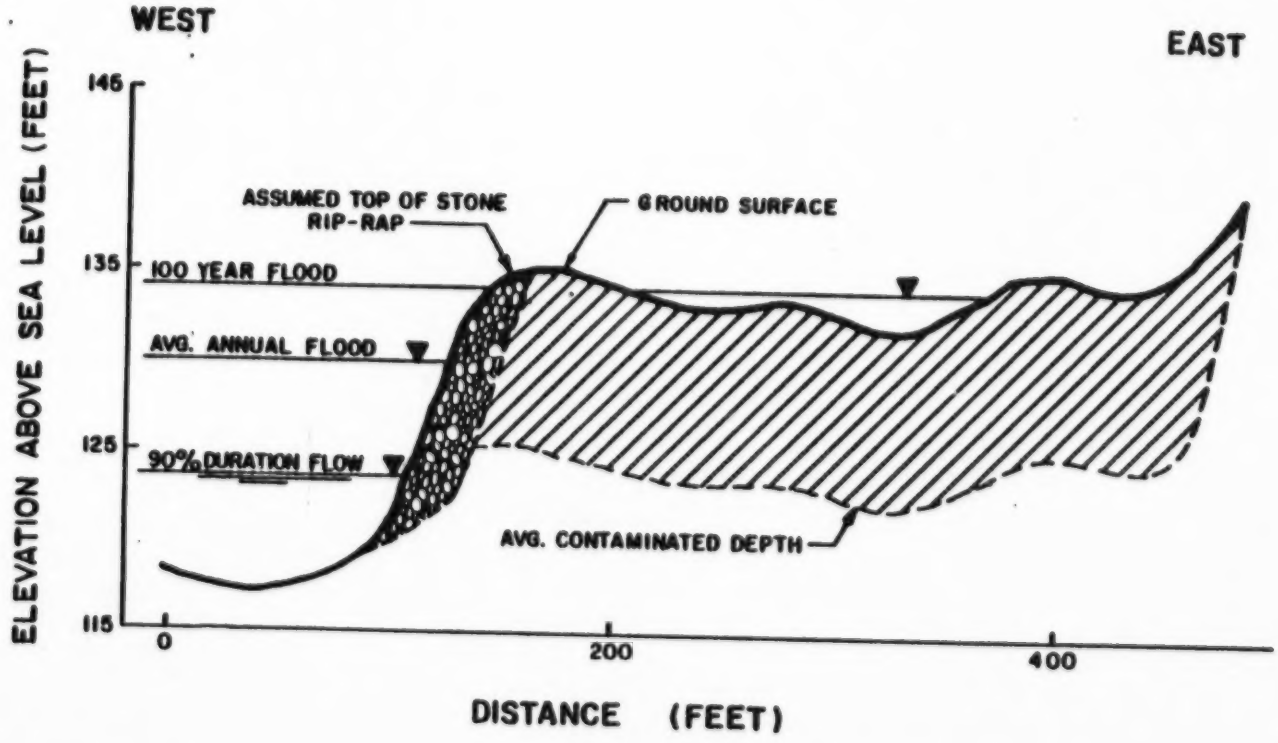


SOURCE: TRANSECT 80+00, MALCOLM PIRNIE (1977)

FIGURE III

TYPICAL CROSS SECTION AT REMNANT DEPOSIT 2
HUDSON RIVER PCB SITE, HUDSON RIVER, NY

NUS CORPORATION
A Halliburton Company

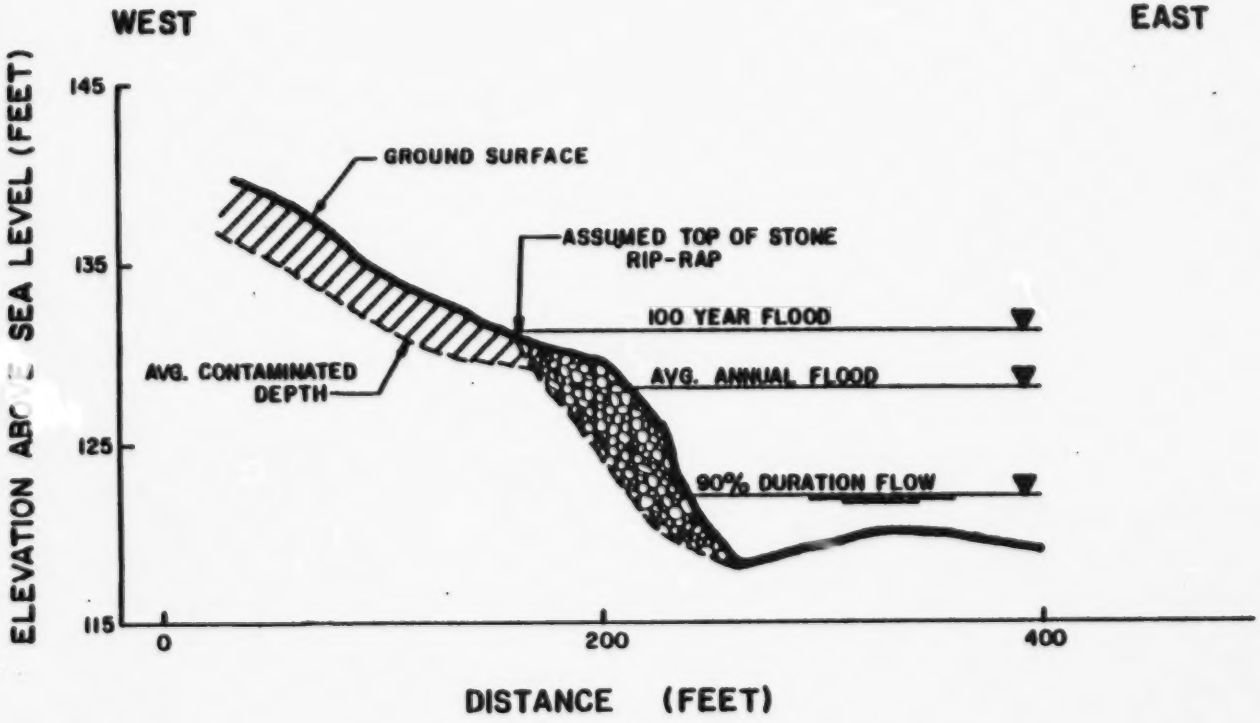


SOURCE: TRANSECT 52+40, MALCOLM PIRNIE (1977)

FIGURE IV.

TYPICAL CROSS SECTION AT REMNANT DEPOSIT 3
HUDSON RIVER PCB SITE, HUDSON RIVER, NY

NUS CORPORATION
A Halliburton Company

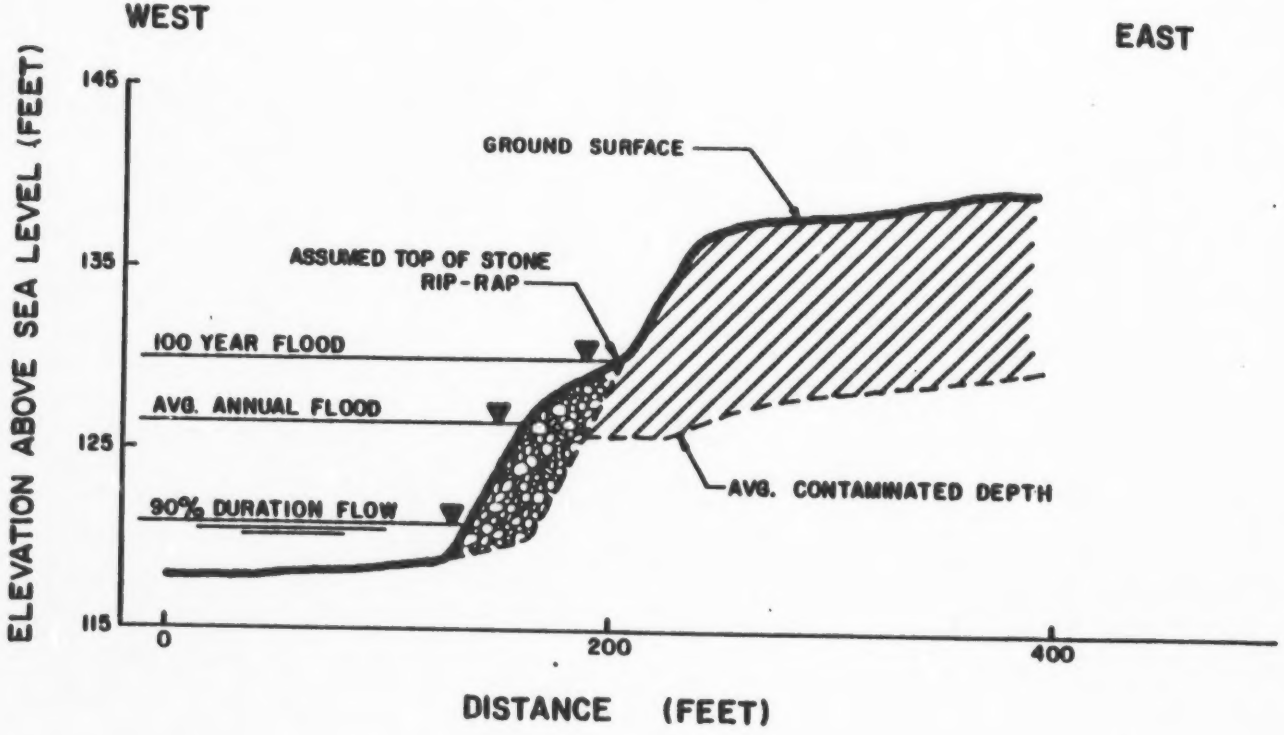


SOURCE: TRANSECT 20+00, MALCOLM PIRNIE (1977)

FIGURE V

TYPICAL CROSS SECTION AT REMNANT DEPOSIT 4
HUDSON RIVER PCB SITE, HUDSON RIVER, NY

NUS CORPORATION
A Halliburton Company



SOURCE: TRANSECT 2+00, MALCOLM PIRNIE (1977)

FIGURE VI

TYPICAL CROSS SECTION AT REMNANT DEPOSIT 5
HUDSON RIVER PCB SITE, HUDSON RIVER, NY

NUS CORPORATION
A Halliburton Company

United States
Environmental Protection
Agency

Region 2
26 Federal Plaza
New York, N.Y. 10007

New Jersey
New York
Puerto Rico
Virgin Islands

Official Business
Penalty for Private Use
$300

Postage and
Fees Paid
Environmental
Protection
Agency
EPA 335

ATTACHMENT 2

EPA

News Release

82(69) Call: Jim Marshall (212)264-2515

FOR RELEASE: Thursday, December 30, 1982

EPA WILL ADDRESS HUDSON RIVER PCBs THROUGH "SUPERFUND"

The U.S. Environmental Protection Agency (EPA) today announced that it will not use the Clean Water Act to fund a demonstration project to remove Hudson River sediments from Albany north to Fort Edward that are contaminated with polychlorinated biphenyls (PCBs). Instead, EPA Administrator Anne M. Gorsuch has determined that the problem should be addressed by means of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA, or "Superfund"). Section 116 of the Clean Water Act required the Administrator to determine whether funds are available from sources other than the Clean Water Act, including Superfund.

This means that more than $18 million in Federal sewage treatment funds that had been set aside for the PCB project will now become available for sewage projects in New York State.

Today's action is the final step in an environmental impact analysis process to evaluate a demonstration project authorized by Section 116 of the Clean Water Act. In the $26.7 million project only 30 to 35% of the contaminated sediments would be selectively removed and disposed of in a secure landfill in Washington County.

more...

Jacqueline E. Schafer, EPA's regional administrator in New York, pointed out that "this extensive analysis has failed to persuade EPA that the partial dredging project would significantly benefit the Hudson River fishery, increase the protection of drinking water or reduce the risk of PCB contamination south of Albany."

"However," she added, "we believe enough concern still exists about the potential for future contamination of drinking water or exposure of the public to the contaminated remnant deposits at Fort Edward to warrant a further look under CERCLA."

A preliminary calculation by EPA shows that the Hudson River PCB problem would score high enough for inclusion on the proposed CERCLA National Priority List of sites for possible action. It is anticipated that the site will be added shortly after the proposed list becomes final. Inclusion of the site on the list will trigger the following actions (most of the needed data and studies were developed during the environmental impact analysis):

- Preparation of a Remedial Action Master Plan (RAMP) to determine whether initial steps to protect the public health are required and whether additional monitoring or sampling is needed;

- A search to identify responsible parties;

- Preparation of a feasibility study addressing such questions as whether any threat could be mitigated by controlling the remnant deposits, whether off-site remedial action may be required because of continued migration of PCBs, and what alternative actions (including no action) may be feasible and cost effective.

If a Superfund-financed action is found to be appropriate, a fund-balancing analysis must be performed to ensure the action would provide a cost-effective response that balances the need to protect public health and the environment at this site with the availability of Superfund dollars to respond to other sites.

Consistent with EPA policy, the agency will also initiate enforcement measures to pursue a privately funded response to the problem. These measures may include a search to identify responsible parties; notice to these parties that Superfund action may be taken and an opportunity, through negotiation, for them to undertake the action; or other appropriate enforcement measures.

If Superfund monies are used, state cost sharing is required.

Copies of today's determination and EPA's Record of Decision are being mailed to all interested parties.

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ATTACHMENT 3

EPA

News Release

83(96) James Marshall (212) 264-2515

FOR RELEASE: October 13, 1983

EPA SCHEDULES PUBLIC MEETING ON PCBs IN THE HUDSON RIVER

NEW YORK -- The U.S. Environmental Protection Agency (EPA) has scheduled a public meeting to discuss the draft feasibility study which looks at alternative remedies for the problem of Hudson River sediments that are contaminated with polychlorinated biphenyls (PCBs) above Albany, N.Y.

The draft feasibility study considered 36 alternative clean-up plans including a number of new PCB treatment and destruction technologies. All reasonable alternatives were considered. The meeting will be held November 3rd, 1983 from 3:00 PM to 5:30 PM and 7:00 PM to 9:00 PM in Meeting Room 1 on the Concourse Level at Governor Nelson A. Rockefeller Empire State Plaza.

Copies of the study are available for public inspection and review at the following locations:

NYS Department of Environmental Conservation (DEC)
202 Mamaroneck Avenue
White Plains, N.Y.

-more-

DEC
21 South Putt Corners Rd.
New Paltz, N.Y.

DEC, Division of Water, Rm. 201
50 Wolf Road
Albany, N.Y.

DEC
2 World Trade Center
Room 6126
New York, N.Y.

Crandall Library
City Park
Glens Falls, N.Y.

The public comment period on the study opened on October 7th and is scheduled to close on November 7th.

All written comments and requests to speak at the public meeting should be mailed to:

Robert Raab, Project Officer
Office of Emergency and Remedial Response
U.S. Environmental Protection Agency
Region II
26 Federal Plaza, Room 402
New York, N.Y. 10278

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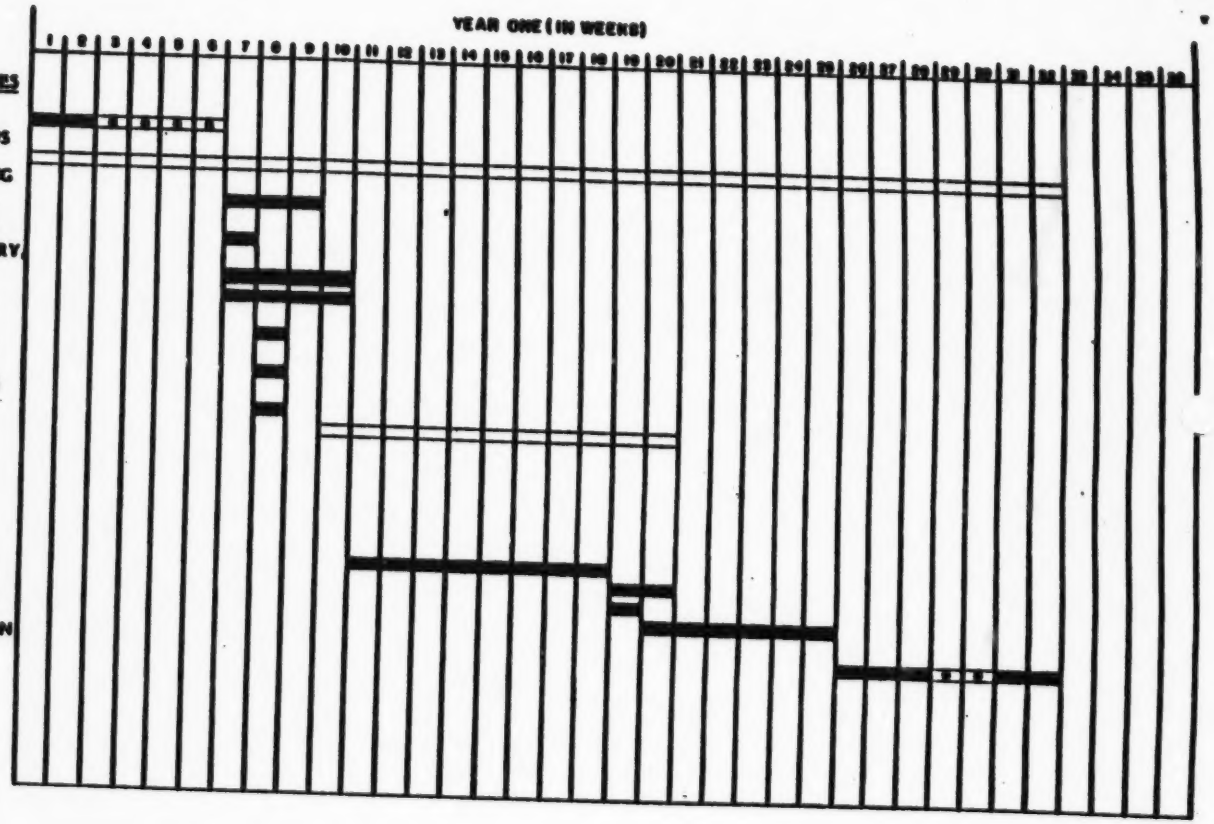

PRELIMINARY REMEDIAL INVESTIGATION ACTIVITIES

- TASK 1 - PREPARE RI WORK PLAN
- TASK 2 - PERFORM COMMUNITY RELATIONS SUPPORT FUNCTIONS
- TASK 3 - COLLECT AND EVALUATE EXISTING DATA
- TASK 4 - PERFORM HEALTH, SAFETY, AND GENERAL SITE RECONNAISSANCE
- TASK 5 - SECURE PERMITS, RIGHTS OF ENTRY, AND OTHER AUTHORIZATIONS
- TASK 6 - PROCURE SUBCONTRACTORS
- TASK 7 - DEVELOP SITE-SPECIFIC HEALTH AND SAFETY PLAN
- TASK 8 - DEVELOP SITE-SPECIFIC QUALITY ASSURANCE PLAN
- TASK 9 - DEVELOP SITE-SPECIFIC SAMPLING PLAN
- TASK 10 - MOBILIZE FIELD EQUIPMENT

SITE REMEDIAL INVESTIGATION ACTIVITIES

- TASK 11 - PERFORM GROUND SURVEY
- TASK 12 - PREPARE TOPOGRAPHIC MAP
- TASK 13 - COLLECT SURFACE SOIL SAMPLES
- TASK 14 - REDUCE AND EVALUATE DATA
- TASK 15 - PREPARE REMEDIAL INVESTIGATION REPORT

TI-5

CONTRACTOR ACTIVITY

PERIODIC CONTRACTOR ACTIVITY AS REQUIRED

EPA / NYSDEC REVIEW

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FIGURE 4

REMEDIAL INVESTIGATION PROJECT SCHEDULE, REMNANT DEPOSITS
HUDSON RIVER PCB SITE, HUDSON RIVER, NY

NUS CORPORATION
A Halliburton Company

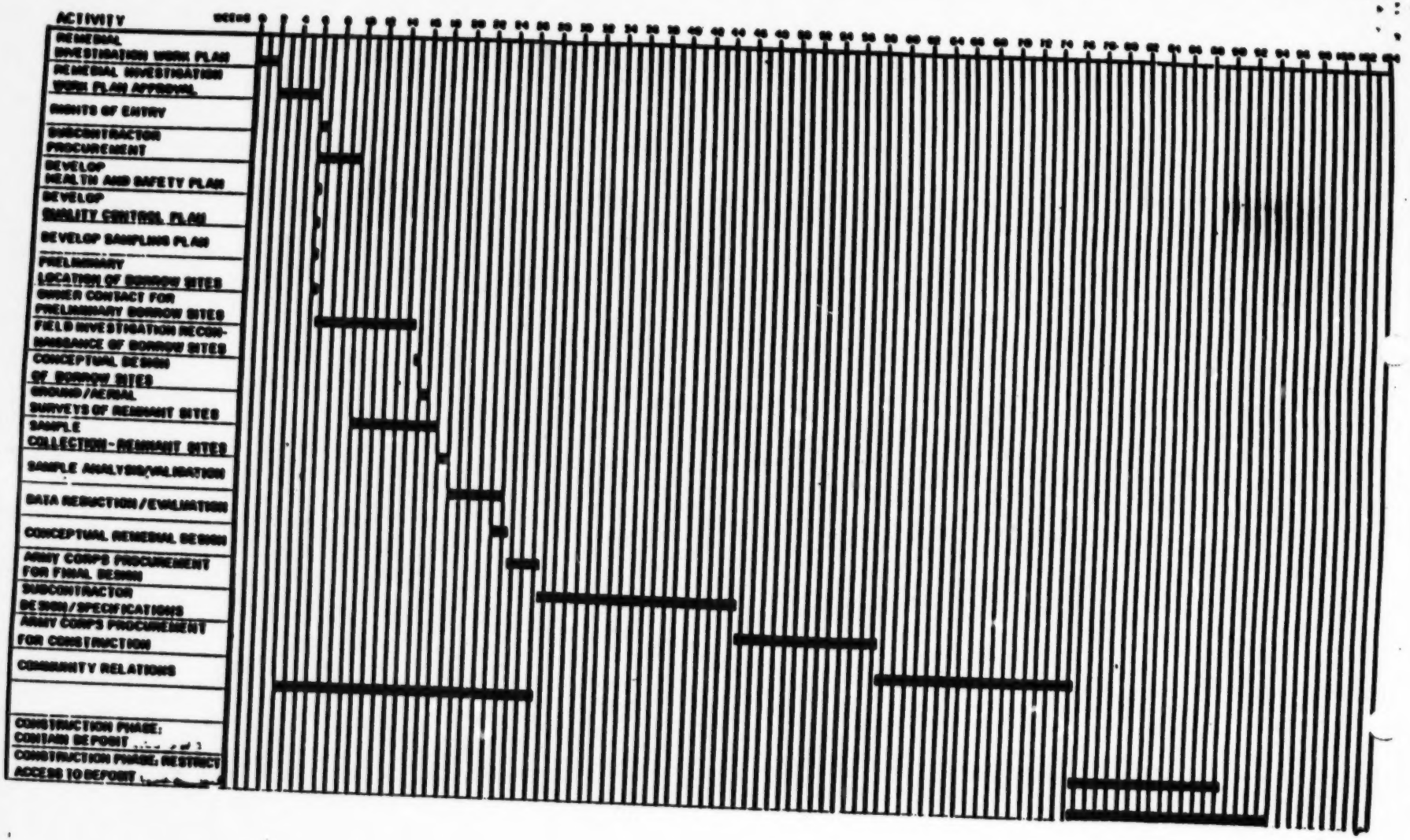

FIGURE 5

PRECONSTRUCTION PHASE
HUDSON RIVER PCB SITE, HUDSON RIVER, NY

NUS CORPORATION
A Halliburton Company